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## ARCHEOLOGY AND ETHNOLOGY.

**Progress of Field Work of the Department of American and Prehistoric Archeology of the University of Pennsylvania.**—Further search for proof of Man's great antiquity in North America has led to an exploration, in November, 1893, of the chalk gorges in southern Texas, where rumor reported the discovery of human relics mixed with the bones of the Mammoth and Fossil Horse. But the alleged sites of artificial hornstone chips and of human interments examined in the San Diego gorge, (Duval County, Texas), belonged not to the fossil-bearing layers but to a talus, which, mingling modern surface loam with ancient underplaced chalk, has greatly obscured the record of the freshet-torn ravine.

Further negative evidence, again illustrating the difficulties to be encountered in the search for human relics in the ancient layers of these parched water courses, was found in the deeper gorge of Indian Creek, near Berclair, (Bee County, Texas), which, like that at San Diego, had in recent years furnished shelter and stagnant drinking water to roving Indian bands. Here artificial chips and fire-fractured stones falling from the loamy crest of a fossil-bearing bluff lay not far from the teeth of the extinct American Horse in an indiscriminate talus below, while the clear, water-eroded cuts, exposing for more than a mile the stratification, (chalk and pebbles, marl and sand 6 to 18 feet and surface loam 2 to 8 feet), showed no human relic in situ to prove that Man in southern Texas had ever been the contemporary of the Mammoth, the Broad-Horned Ox and the Fossil Horse.

Turning again to the record of caves for the traces of Man as a possible predecessor of the Indian and contemporary of an older fauna in the Eastern United States, the dry, well-lit and easily accessible Cavern of Lookout Mountain, on the left Tennessee River bank, below Chattanooga, was examined in December, 1893. Four trenches, 6 feet wide and 5 feet 10 inches to 3 feet deep, dug twice to rock bottom across its floor, proved that Man had lived there. But they surprised us by showing the absence of distinct layers of occupancy separated by crusts of stalagmite, clay, sand or breccia, marking lapses of time between his comings and goings. Here, where the cave's shelter must have been forced upon the notice of primitive people by the narrowness of the river path and the height of the overhanging cliff, but a single bed of refuse, homogeneous throughout and showing no evolu-

tion in the form, material or grade of relics discovered, rested on the cave earth and limestone. No trace of "Paleolithic Man" or "Mound Builder," "Pigmy" or "Welshman" underlaid the familiar black band 3 feet 8 inches at thickest, that betrayed the well-known maker of shell-mixed pottery, bone awls, chert arrowheads, shell beads, drilled sandstone and clay pipes. The Indian, as known to the white discoverer, bringing with him a neolithic culture learned elsewhere, coming as high in the scale as he departed, and who had, as I found, laid the bones of his dead upon inner ledges of the cave and cast them dried and clean with arrowheads, potsherds, and broken perforated gorgets upon mortuary fires in a subterranean chasm 250 paces from the entrance, had alone inhabited the cave.

Paleontology would assert no antiquity for his occupancy as judged by the 29 living and 2 extinct species of fauna found with the refuse. Some animals, traced by their bones in the fire places, like the Spade-Footed Toad, the Bat and the Tortoise, though the contemporaries or successors of the cave inhabitant, may have found their way into the midden heap to die, while the remains of the Unio, (7 species), Io, (2 species), Trypanostoma and Paludina, (2 species), and of the Catfish, Sucker, Drumfish, Land Tortoise, Water Tortoise, Soft-Shell Turtle, Wild Turkey, Marmot, Lynx, Opossum, Squirrel, Raccoon, Otter and Deer, sometimes split and scorched, generally disassociated with teeth and but once showing traces of rodent gnawing, inferred the hunter's capture of food in river and forest and his carrying of larger animal trunks decapitated to the cave feast.

A bone of the extinct Peccary lying in the refuse repeated the discovery made in Queen Esther's chamber of Durham Cave, Pennsylvania. But the teeth of the Tapir (*Tapirus haysii*), and the lower ramus of an extinct Edentate of the family of Megatheriidae kindly identified with all the other bones by Professor Cope, found by us in Section 5 (3rd foot) and close to the bottom of the layer of occupancy, added a new species and another genus to the list of (northwardly) extinct American mammals thus far observed in like association with human remains. Still we had not positively found that the Indian had met this gentle South American herbivore and an animal like the giant sloths *Megalonyx* or *Mylodon*, in the mountainous region of the upper Tennessee, for 1 foot 9 inches of the original red cave earth remained undisturbed and free from bones when examined, under the human refuse. The Tapir teeth and edentate jaw lying where found, near the bottom of the refuse and close to this lower stratum, may have been imbedded in the latter before the Indian came, so that if he

encountered them in scratching his wonted oven hole he might have mixed them with what was to grow by degrees into the present fire-blackened layer.

The awe-inspiring entrance of the Nickajack Cave, (left bank of the Tennessee River, Marion County, Tennessee), though subject to partial invasion by river freshets that back the water of the cave creek several hundred yards into its channel, showed traces of aboriginal habitation as far as light penetrated. But the human refuse lay in a scattered talus on an uneven and craggy floor, about 250 feet wide, which, sloping steeply into the cave stream, was buried under masses of leached earth thrown upon it by nitre diggers in 1863-64. Where the remains of old fires were caught in hollows in the slanting ledge underlying this nitrous deposit, a trench (12 feet 10 inches long by 6 feet wide, by 2 feet 10 to 3 feet 5 inches deep), revealed again a single homogeneous layer of human occupancy continued on an undisturbed shelf clear of the nitre heaps and containing the remains of *Unio* (5 species), *Paludina*, *Trypanostoma*, fresh water Drumfish and Deer, and with its bone awls, arrowheads, chips, hammerstones and pottery repeating the record of the Lookout Cave. Again all trace of more ancient human presence betokened by underplaced deposits was wanting. Earlier peoples, if they existed, had avoided the Nickajack Cavern, and it is only pre-Columbian inhabitant had been the Neolithic Indian, who, strewing the alluvial meadows at its mouth with arrowheads and hornstone chips, had left potsherds, pebble hammers and a perforated ceremonial stone, along with the remains of the cave midden Mollusca and the Deer, Tortoise and Rabbit, at the river-side shell heaps a mile away.

Throughout the above investigation we have owed a grateful acknowledgement to the suggestion and kind encouragement and assistance of Professor Cope.—H. C. MERCER.

**The Trenton Gravel Discussion** has thrown light upon Man's antiquity in North America, but has not settled it.

We know that geologically, modern Indians chipped the rude leaf shaped outlines which we may as well call "Turtlebacks," but we do not yet know who else made them. The "Turtleback" exists without the Indian in Europe, and the more we study it the less—unhelped by associated evidence—we care to call it "Paleolith" or "Implement" on the one hand, or "Reject" "Unfinished Implement" or "Failure" on the other.

It was the quarry "Turtleback" of the pot making stone polishing Indian, that first fairly roused attention, and troubled us with the fear lest the Trenton "Turtlebacks" resembling it, had slipped down into the glacial gravels.

Some of the quarry "Turtlebacks" (viz., the spade like outlines from Garland Co., Arkansas), were big. Some (as the  $\frac{1}{2}$  inch long specimens from Macungie, Pa., and Flint Ridge, Ohio), were little. Some were made of pebbles (Piney Branch), some of native rock, some of Jasper, some (Gaddis' Run) of argillite, some were tolerably thinned before they left the quarry (Piney Branch and Flint Ridge). Others (Gaddis' Run) were not, some were leaf shaped, some rather triangular, others discoidal.

Still there was a family resemblance, and it seemed after examining thirteen American quarries east of the Rocky Mountains, that certain universal laws for blade chipping in the stone age had been discovered, for instance, that as the Indian quarrymen were yet Indians though they left no "Indian Relics" at the diggings, so the Drift Man (if he existed), though he left nothing but "Turtlebacks" in the Drift, might really have been a stone polisher and potter after all.

But to find arrowheads close by the pits at Flint Ridge, Macungie, and Saucon Creek, pitted hammerstones at Gaddis' Run, polished stone tools at Durham, and pointed wooden billets at Macungie, limited the ground for such inference, and as we may hope to find a rotting fuse or rusty iron drill under a heap of belgian blocks at a modern quarry, so there seems a chance of finding polished stone tools, arrowheads and pottery in the Drift, if the Drift Man made such things.

The fact that the Indians had quarried the stone, blocked it out into blade forms, rejected some of these, worked others into oft buried "blanks" and specialized the latter into spears and knives, seemed at first to indicate that an implement to be finished, and therefore to fairly represent the culture of its maker ought to be specialized. But the rule would not work always. The "Turtleback" was not the neglected brother of all chipped stone tools. What at Fort Bridger, Dakota, (as seen by Dr. Leidy in 1870) were serviceable implements (Teshoas) chipped by Indians from pebbles at a single blow, were at Washington quarry refuse chips. The flakes that were rubbish at Macungie and Flint Ridge, were hoarded together and carefully buried in Florida Mounds. If we went abroad we found in the Easter Island, knives, Admiralty Island, spears and Australian gum-mounted splinters, implements which were finished but yet unspecialized; and Mr. Ernest Volk showed us that "Turtleback" labelling might go wrong

at the very heart of the question where the ground seemed surest, when he found two hoards of rough argillite "Turtlebacks" which by all quarry experience ought to have been "rejects."

A whole new class of pros and cons were introduced into the study when we discovered in June at the argillite outcrop and indian blade quarry in the Delaware Valley, 20 miles above the hunting ground for the Trenton Turtlebacks; that there were two classes of Indian Turtlebacks—those of the quarry and those of the river-side. The evidence of these latter river-side specimens made from surface material, and that of Jasper pebbles found flaked by Indians at sea shore camp sites in New Jersey and Maryland, suggested strongly that "quarries" were comparatively modern and that rules of stone chipping derived therefrom would not cover the whole ground.

It seemed that the Indian must have been for a time a chipper of erratic stones on river beaches before the status of culture involved by quarries was reached, and that "Turtleback" work shops of what might be called a pre-quarry age, probably existed in the United States older than Flint Ridge, Durham, Gaddis' Run and Piney Branch, whose products remained to be compared with the alleged work in argillite of the Drift Man.

It was important to note that of the recorded argillite Trenton specimens, 29 were of this Delaware Indian "river-side" type, but against the case that one (Peabody Museum, No. 33,168, labelled as found 9 feet below the surface in the Penna. R. R. cut) had the stamp of the Gaddis' Run Indian quarry strongly upon it.—H. C. MERCER.